OM-2218 186865G
July 1998

Processes

TIG (GTAW) Welding

Stick (SMAW) Welding

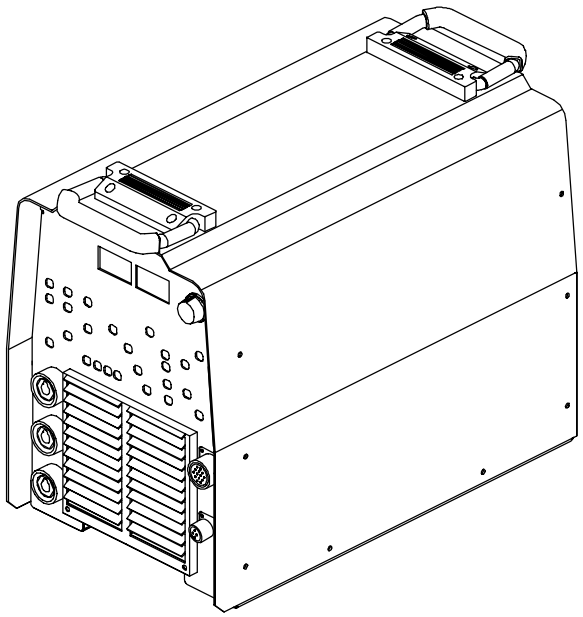
Description

3 Phase DC CC

Arc Welding Power Source

CE

Maxstar® 300



OWNER'S MANUAL

Visit our website at
www.MillerWelds.com

From Miller to You

Thank you and *congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite. We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide which exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.

ISO 9001 REGISTERED QUALITY SYSTEM

Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001 Quality System Standard.

Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual catalog sheets. **To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at www.MillerWelds.com on the web.**

TRUE BLUE® WARRANTY

Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.

Miller offers a Technical Manual which provides more detailed service and parts information for your unit. To obtain a Technical Manual, contact your local distributor. Your distributor can also supply you with Welding Process Manuals such as SMAW, GTAW, GMAW, and GMAW-P.

Miller® *The Power of Blue.*

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The following terms are used interchangeably throughout this manual:
TIG = GTAW
Stick = SMAW

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Declaration of Conformity For European Community (CE) Products

NOTE ☞	*This information is provided for units with CE certification (see rating label on unit.)*

Manufacturer's Name: Miller Electric Mfg. Co.

Manufacturer's Address: 1635 W. Spencer Street
Appleton, WI 54914 USA

Declares that the product: **Maxstar 300** ®

conforms to the following Directives and Standards:

Directives

Low Voltage Directive: 73/23/EEC

Machinery Directives: 89/392/EEC, 91/368/EEC, 93/C 133/04, 93/68/EEC

Electromagnetic Capability Directives: 89/336, 92/31/EEC

Standards

Safety Requirements for Arc Welding Equipment part 1: EN 60974-1: 1990

Arc Welding Equipment Part 1: Welding Power Sources: IEC 974-1 (December 1996 – Draft revision)

Degrees of Protection provided by Enclosures (IP code): IEC 529: 1989

Insulation coordination for equipment within low-voltage systems: Part 1: Principles, requirements and tests: IEC 664-1: 1992

Electromagnetic compatibility (EMC) Product standard for arc welding equipment: EN50199: August 1995

European Contact: Mr. Luigi Vacchini, Managing Director
MILLER Europe S.P.A.
Via Privata Iseo
20098 San Giuliano
Milanese, Italy

Telephone: 39(02)98290-1
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SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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1-1. Symbol Usage

Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ **Marks a special safety message.**

Means "Note"; not safety related.

This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Arc Welding Hazards

▲ **The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-4. Read and follow all Safety Standards.**

▲ **Only qualified persons should install, operate, maintain, and repair this unit.**

▲ **During operation, keep everybody, especially children, away.**

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable – do not use work clamp or work cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.

FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

ARC RAYS can burn eyes and skin.

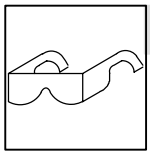
Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.

WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.



FLYING METAL can injure eyes.

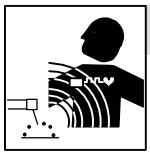
- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.

BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.

HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on gun or torch.



MAGNETIC FIELDS can affect pacemakers.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.

CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

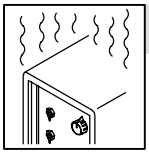
1-3. Additional Symbols For Installation, Operation, And Maintenance

FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.

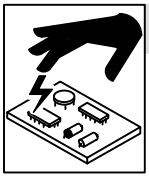
FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



OVERUSE can cause OVERHEATING

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

MOVING PARTS can cause injury.

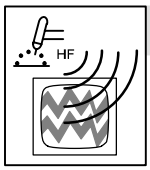
- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.

WELDING WIRE can cause injury.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.



H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.

ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

1-4. Principal Safety Standards

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-5. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: “The body of evidence, in the committee’s judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard.” However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

About Pacemakers:

Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

SECTION 1 – CONSIGNES DE SECURITE – LIRE AVANT UTILISATION

1-1. Signification des symboles

Signifie Mise en garde ! Soyez vigilant ! Cette procédure présente des risques de danger ! Ceux-ci sont identifiés par des symboles adjacents aux directives.

▲ **Identifie un message de sécurité particulier.**

Signifie NOTA ; n'est pas relatif à la sécurité.

Ce groupe de symboles signifie Mise en garde ! Soyez vigilant ! Il y a des risques de danger reliés aux CHOCS ÉLECTRIQUES, aux PIÈCES EN MOUVEMENT et aux PIÈCES CHAUDES. Reportez-vous aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout danger.

1-2. Dangers relatifs au soudage à l'arc

▲ **Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous voyez un symbole, soyez vigilant et suivez les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les normes de sécurité énumérées à la section 1-4. Veuillez lire et respecter toutes ces normes de sécurité.**

▲ **L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.**

▲ **Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.**

UN CHOC ÉLECTRIQUE peut tuer.

Un simple contact avec des pièces électriques peut provoquer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension dès que l'appareil est sur ON. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension à ce moment-là. En soudage semi-automatique ou automatique, le fil, le dévidoir, le logement des galets d'entraînement et les pièces métalliques en contact avec le fil de soudage sont sous tension. Des matériels mal installés ou mal mis à la terre présentent un danger.

- Ne jamais toucher les pièces électriques sous tension.
- Porter des gants et des vêtements de protection secs ne comportant pas de trous.
- S'isoler de la pièce et de la terre au moyen de tapis ou d'autres moyens isolants suffisamment grands pour empêcher le contact physique éventuel avec la pièce ou la terre.
- Ne pas se servir de source électrique àcourant électrique dans les zones humides, dans les endroits confinés ou là où on risque de tomber.
- Se servir d'une source électrique àcourant électrique UNIQUEMENT si le procédé de soudage le demande.
- Si l'utilisation d'une source électrique àcourant électrique s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Déverrouiller l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir normes de sécurité).
- Installer et mettre à la terre correctement cet appareil conformément à son manuel d'utilisation et aux codes nationaux, provinciaux et municipaux.
- Toujours vérifier la terre du cordon d'alimentation – Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d'entrée fixer d'abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Vérifier fréquemment le cordon d'alimentation pour voir s'il n'est pas endommagé ou dénudé – remplacer le cordon immédiatement s'il est endommagé – un câble dénudé peut provoquer une électrocution.
- Mettre l'appareil hors tension quand on ne l'utilise pas.
- Ne pas utiliser des câbles usés, endommagés, de grosseur insuffisante ou mal épissés.
- Ne pas enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct – ne pas utiliser le connecteur de pièce ou le câble de retour.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode provenant d'une autre machine.
- N'utiliser qu'un matériel en bon état. Réparer ou remplacer sur-le-champ les pièces endommagées. Entretenir l'appareil conformément à ce manuel.
- Porter un harnais de sécurité quand on travaille en hauteur.
- Maintenir solidement en place tous les panneaux et capots.
- Fixer le câble de retour de façon à obtenir un bon contact métal-métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.

Il y a DU COURANT CONTINU IMPORTANT dans les convertisseurs après la suppression de l'alimentation électrique.

- Arrêter les convertisseurs, débrancher le courant électrique, et décharger les condensateurs d'alimentation selon les instructions indiquées dans la partie entretien avant de toucher les pièces.

LES FUMÉES ET LES GAZ peuvent être dangereux.

Le soudage génère des fumées et des gaz. Leur inhalation peut être dangereux pour votre santé.

- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- A l'intérieur, ventiler la zone et/ou utiliser un échappement au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage.
- Si la ventilation est insuffisante, utiliser un respirateur à alimentation d'air homologué.
- Lire les spécifications de sécurité des matériaux (MSDSs) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraisseurs.
- Travailler dans un espace fermé seulement s'il est bien ventilé ou en portant un respirateur à alimentation d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l'air et abaisser le niveau d'oxygène provoquant des blessures ou des accidents mortels. S'assurer que l'air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.
- Ne pas souder des métaux munis d'un revêtement, tels que l'acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n'ait été enlevé dans la zone de soudure, que l'endroit soit bien ventilé, et si nécessaire, en portant un respirateur à alimentation d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.

LES RAYONS DE L'ARC peuvent provoquer des brûlures dans les yeux et sur la peau.

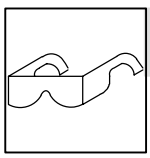
Le rayonnement de l'arc du procédé de soudage génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de provoquer des brûlures dans les yeux et sur la peau. Des étincelles sont projetées pendant le soudage.

- Porter un casque de soudage muni d'un écran de filtre approprié pour protéger votre visage et vos yeux pendant le soudage ou pour regarder (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des protections approuvés pour les oreilles si le niveau sondre est trop élevé.
- Utiliser des écrans ou des barrières pour protéger des tiers de l'éclair et de l'éblouissement; demander aux autres personnes de ne pas regarder l'arc.
- Porter des vêtements de protection constitué dans une matière durable, résistant au feu (cuir ou laine) et une protection des pieds.

LE SOUDAGE peut provoquer un incendie ou une explosion.

Le soudage effectué sur des conteneurs fermés tels que des réservoirs, tambours ou des conduites peut provoquer leur éclatement. Des étincelles peuvent être projetées de l'arc de soudure. La projection d'étincelles, des pièces chaudes et des équipements chauds peut provoquer des incendies et des brûlures. Le contact accidentel de l'électrode avec des objets métalliques peut provoquer des étincelles, une explosion, un surchauffement ou un incendie. Avant de commencer le soudage, vérifier et s'assurer que l'endroit ne présente pas de danger.

- Se protéger et d'autres personnes de la projection d'étincelles et de métal chaud.
- Ne pas souder dans un endroit là où des étincelles peuvent tomber sur des substances inflammables.
- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité les recouvrir soigneusement avec des protections homologués.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu'ils n'aient été préparés correctement conformément à AWS F4.1 (voir les normes de sécurité).
- Brancher le câble sur la pièce le plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porte-électrode ou couper le fil à la pointe de contact.
- Porter des vêtements de protection dépourvus d'huile tels que des gants en cuir, une chemise en matériau lourd, des pantalons sans revers, des chaussures hautes et un couvre chef.
- Avant de souder, retirer toute substance combustible de vos poches telles qu'un allumeur au butane ou des allumettes.



DES PARTICULES VOLANTES peuvent blesser les yeux.

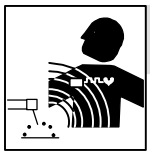
- Le soudage, l'écaillement, le passage de la pièce à la brosse en fil de fer, et le meulage génèrent des étincelles et des particules métalliques volantes. Pendant la période de refroidissement des soudures, elles risquent de projeter du laitier.
- Porter des lunettes de sécurité avec écrans latéraux ou un écran facial.

LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.

- Fermer l'alimentation du gaz protecteur en cas de non utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d'un respirateur d'adduction d'air homologué.

DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.

- Ne pas toucher des parties chaudes à mains nues
- Prévoir une période de refroidissement avant d'utiliser le pistolet ou la torche.



LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.

LE BRUIT peut affecter l'ouïe.

Le bruit des processus et des équipements peut affecter l'ouïe.

- Porter des protections approuvés pour les oreilles si le niveau sondre est trop élevé.

Si des BOUTEILLES sont endommagées, elles pourront exploser.

Des bouteilles de gaz protecteur contiennent du gaz sous haute pression. Si une bouteille est endommagée, elle peut exploser. Du fait que les bouteilles de gaz font normalement partie du procédé de soudage, les manipuler avec précaution.

- Protéger les bouteilles de gaz comprimé d'une chaleur excessive, des chocs mécaniques, du laitier, des flammes ouvertes, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte-bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais placer une torche de soudage sur une bouteille à gaz.
- Une électrode de soudage ne doit jamais entrer en contact avec une bouteille.
- Ne jamais souder une bouteille pressurisée – risque d'explosion.
- Utiliser seulement des bouteilles de gaz protecteur, régulateurs, tuyaux et raccords convenables pour cette application spécifique; les maintenir ainsi que les éléments associés en bon état.
- Ne pas tenir la tête en face de la sortie en ouvrant la soupape de la bouteille.
- Maintenir le chapeau de protection sur la soupape, sauf en cas d'utilisation ou de branchement de la bouteille.
- Lire et suivre les instructions concernant les bouteilles de gaz comprimé, les équipements associés et les publications P-1 CGA énumérées dans les normes de sécurité.

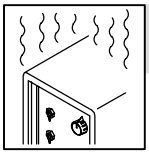
1-3. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance

Risque D'INCENDIE OU D'EXPLOSION.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces infllammables.
- Ne pas installer l'appareil à proximité de produits inflammables
- Ne pas surcharger l'installation électrique – s"assurer que l'alimentation est correctement dimensionné et protégé avant de mettre l'appareil en service.

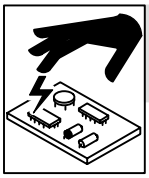
LA CHUTE DE L'APPAREIL peut blesser.

- Utiliser l'anneau de levage uniquement pour soulever l'appareil, NON PAS les chariot, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un engin d'une capacité appropriée pour soulever l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.



L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- Prévoir une période de refroidissement, respecter le cycle opératoire nominal.
- Réduire le courant ou le cycle opératoire avant de recommancer le soudage.
- Ne pas obstruer les passages d'air du poste.



LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Établir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimes.

DES ORGANES MOBILES peuvent provoquer des blessures.

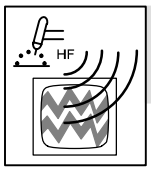
- Ne pas s'approcher des organes mobiles.
- Ne pas s'approcher des points de coincement tels que des rouleaux de commande.

LES FILS DE SOUDAGE peuvent provoquer des blessures.

- Ne pas appuyer sur la gachette avant d'en avoir reçu l'instruction.
- Ne pas diriger le pistolet vers soi, d'autres personnes ou toute pièce mécanique en engageant le fil de soudage.

DES ORGANES MOBILES peuvent provoquer des blessures.

- Rester à l'écart des organes mobiles comme le ventilateur.
- Maintenir fermés et fixement en place les portes, panneaux, recouvrements et dispositifs de protection.



LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- Le rayonnement haute frequence peut provoquer des interférences avec les équipements de radio–navigation et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.
- Si le FCC signale des interférences, arrêter immédiatement l'appareil.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et et un blindage pour réduire les interférences éventuelles.

LE SOUDAGE À L'ARC risque de provoquer des interférences.

- L'énergie électromagnétique risque de provoquer des interférences pour l'équipement électronique sensible tel que les ordinateurs et l'équipement commandé par ordinateur tel que les robots.
- Veiller à ce que tout l'équipement de la zone de soudage soit compatible électromagnétiquement.
- Pour réduire la possibilité d'interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à souder à une distance de 100 mètres de tout équipement électronique sensible.
- Veiller à ce que ce poste de soudage soit posé et mis à la terre conformément à ce mode d'emploi.
- En cas d'interférences après avoir pris les mesures précédentes, il incombe à l'utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l'utilisation de câbles blindés, l'utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.

LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.

1-4. Principales normes de sécurité

Safety in Welding and Cutting, norme ANSI Z49.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

Safety and Health Sandards, OSHA 29 CFR 1910, du Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practice for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, norme AWS F4.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

National Electrical Code, NFPA Standard 70, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, de la Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Règles de sécurité en soudage, coupage et procédés connexes, norme CSA W117.2, de l'Association canadienne de normalisation, vente de normes, 178 Rexdale Boulevard, Rexdale (Ontario) Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, norme ANSI Z87.1, de l'American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, norme NFPA 51B, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-5. Information sur les champs électromagnétiques

Données sur le soudage électrique et sur les effets, pour l'organisme, des champs magnétiques basse fréquence

Le courant de soudage, pendant son passage dans les câbles de soudage, causera des champs électromagnétiques. Il y a eu et il y a encore un certain souci à propos de tels champs. Cependant, après avoir examiné plus de 500 études qui ont été faites pendant une période de recherche de 17 ans, un comité spécial ruban bleu du National Research Council a conclu: "L'accumulation de preuves, suivant le jugement du comité, n'a pas démontré que l'exposition aux champs magnétiques et champs électriques à haute fréquence représente un risque à la santé humaine". Toutefois, des études sont toujours en cours et les preuves continuent à être examinées. En attendant que les conclusions finales de la recherche soient établies, il vous serait souhaitable de réduire votre exposition aux champs électromagnétiques pendant le soudage ou le coupage.

Afin de réduire les champs électromagnétiques dans l'environnement de travail, respecter les consignes suivantes :

1 Garder les câbles ensembles en les torsadant ou en les attachant avec du ruban adhésif.

2 Mettre tous les câbles du côté opposé de l'opérateur.

3 Ne pas courber pas et ne pas entourer pas les câbles autour de votre corps.

4 Garder le poste de soudage et les câbles le plus loin possible de vous.

5 Relier la pince de masse le plus près possible de la zone de soudure.

Consignes relatives aux stimulateurs cardiaques :

Les personnes qui portent un stimulateur cardiaque doivent avant tout consulter leur docteur. Si vous êtes déclaré apte par votre docteur, il est alors recommandé de respecter les consignes ci–dessus.

SECTION 2 – DEFINITIONS

2-1. Warning Label Definitions

Warning! Watch Out! There are possible hazards as shown by the symbols.

1 Electric shock from welding electrode or wiring can kill.

1.1 Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves.

1.2 Protect yourself from electric shock by insulating yourself from work and ground.

1.3 Disconnect input plug or power before working on machine.

2 Breathing welding fumes can be hazardous to your health.

2.1 Keep your head out of the fumes.

2.2 Use forced ventilation or local exhaust to remove the fumes.

2.3 Use ventilating fan to remove fumes.

3 Welding sparks can cause explosion or fire.

3.1 Keep flammables away from welding. Do not weld near flammables.

3.2 Welding sparks can cause fires. Have a fire extinguisher nearby, and have a watchperson ready to use it.

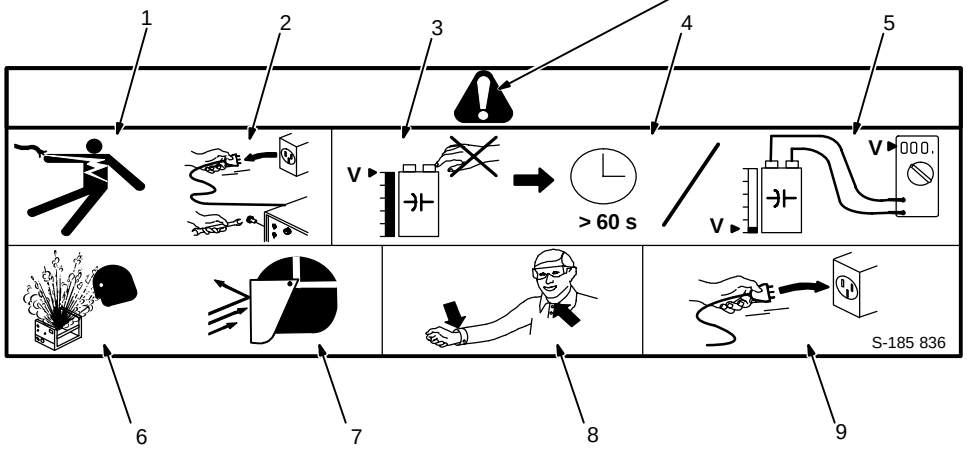
3.3 Do not weld on drums or any closed containers.

4 Arc rays can burn eyes and injure skin.

4.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.

5 Become trained and read the instructions before working on the machine or welding.

6 Do not remove or paint over (cover) the label.



Warning! Watch Out! There are possible hazards as shown by the symbols.

1 Electric shock from wiring can kill.

2 Disconnect input plug or power before working on machine.

3 Hazardous voltage remains on input capacitors after power is turned off. Do not touch fully charged capacitors.

4 Always wait 60 seconds after power is turned off before working on unit, OR

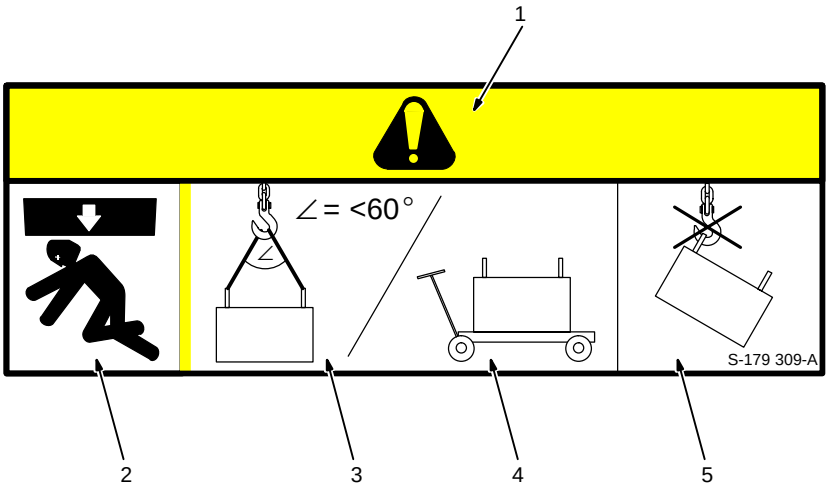
5 Check input capacitor voltage, and be sure it is near 0 before touching any parts.

6 When power is applied failed parts can explode or cause other parts to explode.

7 Flying pieces of parts can cause injury. Always wear a face shield when servicing unit.

8 Always wear long sleeves and button your collar when servicing unit.

9 After taking proper precautions as shown, connect power to unit.



1 Warning! Watch Out! There are possible hazards as shown by the symbols.

2 Falling equipment can cause injury and damage to unit.

3 Always lift and support unit using both handles. Keep angle of lifting device less than 60 degrees.

4 Use a proper cart to move unit.

5 Do not use one handle to lift or support unit.

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2-2. Symbols And Definitions

A Amperes	Panel–Local	Gas Tungsten Arc Welding (GTAW)	Shielded Metal Arc Welding (SMAW)
V Volts	Input	3 Phase Static Frequency Converter-Transformer-Rectifier	
Output	Circuit Breaker	Remote	Touch Start (GTAW)
Protective Earth (Ground)	Postflow Timer (t_2)	Preflow Timer (t_1)	S Seconds
On	Off	Positive	Negative
Alternating Current	Gas Input	Gas Output	I_2 Rated Welding Current
X Duty Cycle	Direct Current	Line Connection	U_2 Conventional Load Voltage
U_1 Primary Voltage	IP Degree Of Protection	I_{1max} Rated Maximum Supply Current	I_{1eff} Maximum Effective Supply Current
U_0 Rated No Load Voltage (Average)	Pulse Background Amperage	Initial Amperage	Increase/Decrease Of Quantity
Normal Trigger Operation (GTAW)	Two-Step Trigger Operation (GTAW)	Four-Step Trigger Operation (GTAW)	% Percent
Hz Hertz	Recall From Memory	Arc Force (DIG)	Impulse Starting (GTAW)
Final Slope	Final Amperage	Pulse Percent On Time	Initial Slope
Contactor Control (Stick)	Pulser On-Off	TIG Weld Amps And Peak Amps While Pulsing	Pulse Frequency

SECTION 3 – INSTALLATION

3-1. Specifications

Rated Output at 60% Duty Cycle	Welding Amperage Range	Max. Open-Circuit Voltage	Amperes Input At Rated Output, 50Hz - Three-Phase 400 V	KVA	KW	Dimensions	Net Weight
250 A @ 30 VDC, 60% Duty Cycle	5 – 300	90	16.9 0.15*	11.7 0.10*	8.6 0.03*	H: 17 in (432 mm) W: 12-1/2 in (318 mm) D: 24 in (610 mm)	82 lb (37 kg) 100 lb (45 kg) w/ auxiliary power
*While idling							

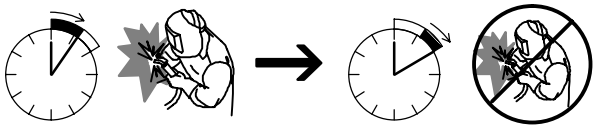
3-2. Duty Cycle And Overheating

Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

If unit overheats, output stops, a Help message is displayed (see Section 5-3), and cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or voltage, or duty cycle before welding.

Exceeding duty cycle can damage unit and void warranty.

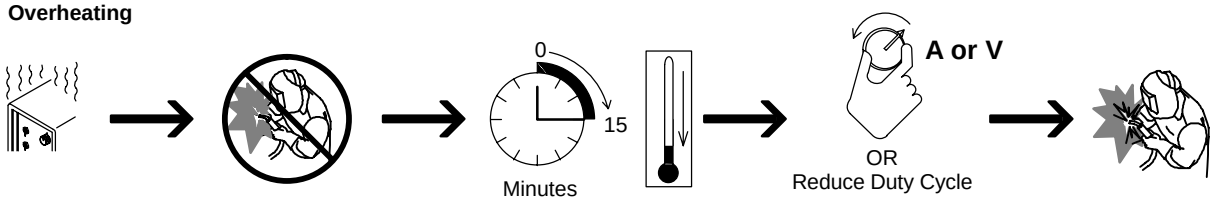
250 A @ 60% Duty Cycle



6 Minutes Welding

4 Minutes Resting

Overheating



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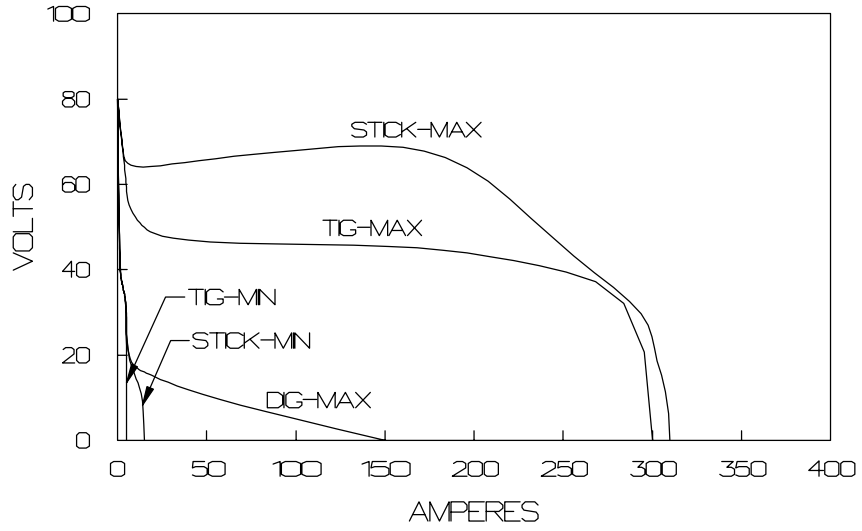
3-3. Volt-Ampere Curves

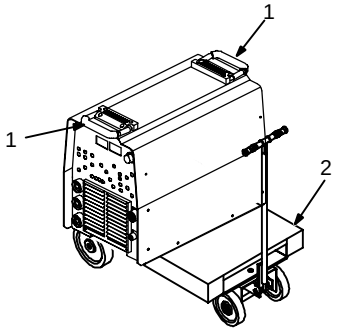


Volt-ampere curves show minimum and maximum voltage and amperage output capabilities of welding power source. Curves of other settings fall between curves shown.

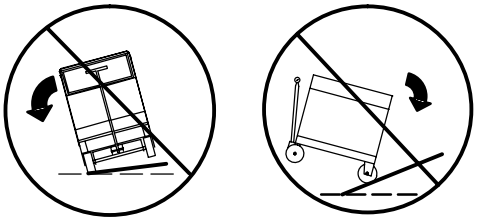
ST-186 864

3-4. Selecting A Location

Movement



Do not move or operate unit where it could tip.



1 Lifting Handles

Use handles to lift unit.

2 Hand Cart

Use cart or similar device to move unit.

3 Rating Label

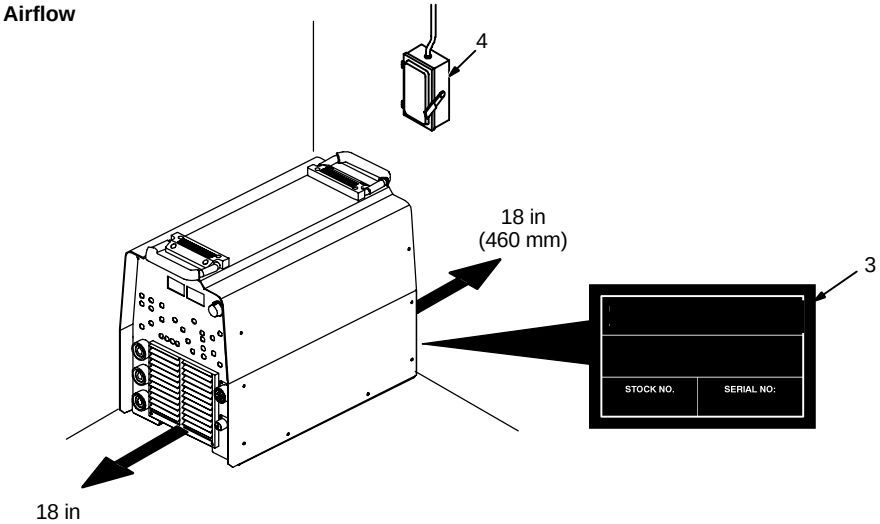
Use rating label to determine input power needs.

4 Line Disconnect Device

Locate unit near correct input power supply.

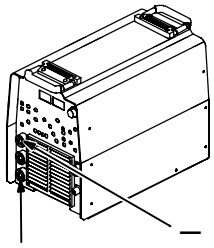
Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.

Airflow



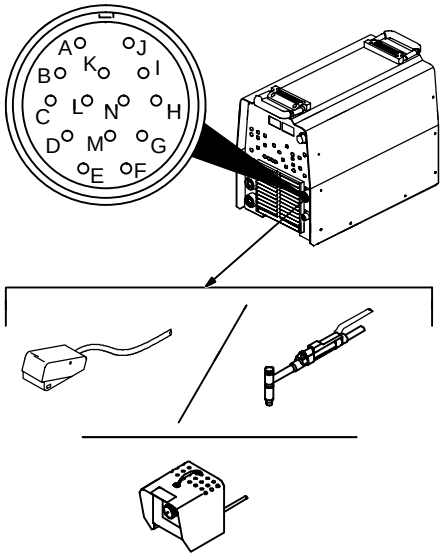
ST-801 956-A

3-5. Weld Output Terminals And Selecting Cable Sizes

		Total Cable (Copper) Length In Weld Circuit Not Exceeding							
		100 ft (30 m) Or Less		150 ft (45 m)	200 ft (60 m)	250 ft (70 m)	300 ft (90 m)	350 ft (105 m)	400 ft (120 m)
Weld Output Terminals	Welding Amperes	10 – 60% Duty Cycle	60 – 100% Duty Cycle	10 – 100% Duty Cycle					
 Output Receptacles	100	4	4	4	3	2	1	1/0	1/0
	150	3	3	2	1	1/0	2/0	3/0	3/0
	200	3	2	1	1/0	2/0	3/0	4/0	4/0
	250	2	1	1/0	2/0	3/0	4/0	2-2/0	2-2/0
	300	1	1/0	2/0	3/0	4/0	2-2/0	2-3/0	2-3/0
	350	1/0	2/0	3/0	4/0	2-2/0	2-3/0	2-3/0	2-4/0

Weld cable size (AWG) is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere. S-0007-D

3-6. Remote 14 Receptacle Information

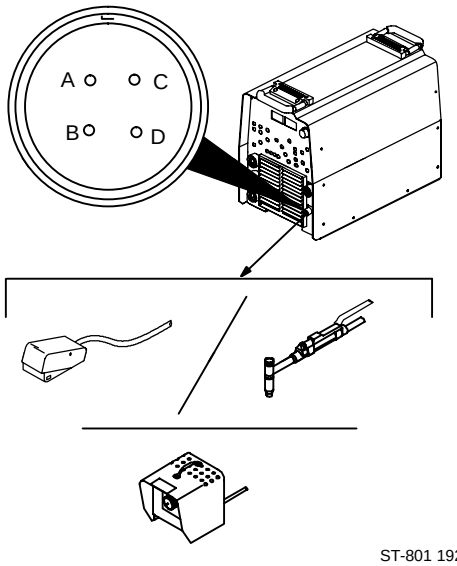


ST-801 192-A

REMOTE 14	Socket*	Socket Information
24 VOLTS DC **OUTPUT CONTACTOR**	A	Contactor control 24 volts dc.
	B	Contact closure to A completes 24 volts dc contactor control circuit and enables output.
REMOTE OUTPUT CONTROL	C	Output to remote control; 0 to +10 volts dc output to remote control.
	D	Remote control circuit common.
	E	0 to +10 volts dc input command signal from remote control.
A/V AMPERAGE VOLTAGE	F	Current feedback; +1 volt dc per 100 amperes.
	H	Voltage feedback; +1 volt dc per 10 output receptacle volts.
GND	K	Chassis common.

*The remaining sockets are not used.

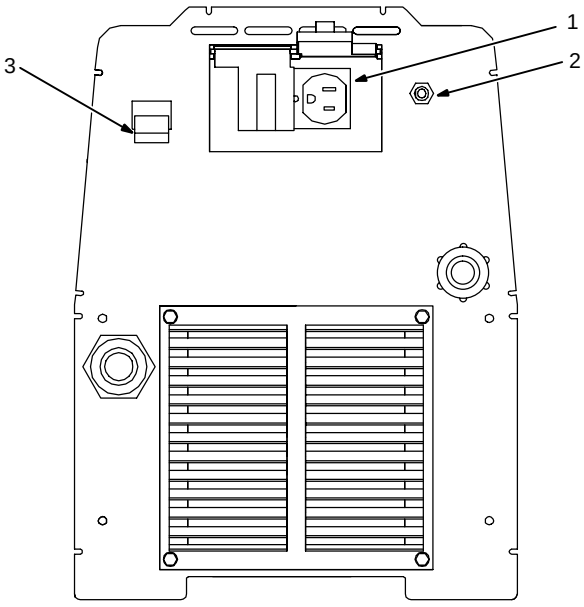
3-7. Remote 4 Receptacle Information



ST-801 192-A

REMOTE 4	Socket*	Socket Information
24 VOLTS DC **OUTPUT CONTACTOR**	A	Contactor control 24 volts dc.
	B	Contact closure to A completes 24 volts dc contactor control circuit and enables output.

3-8. 115 Volts AC Duplex Receptacle, Circuit breaker (Optional), And Power Switch



1 115 V 7 A AC Receptacle

2 Circuit Breaker CB1

CB1 protects duplex receptacle from overload.

Press button to reset breaker.

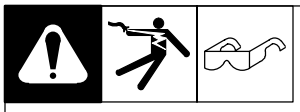
3 Power On/Off Switch

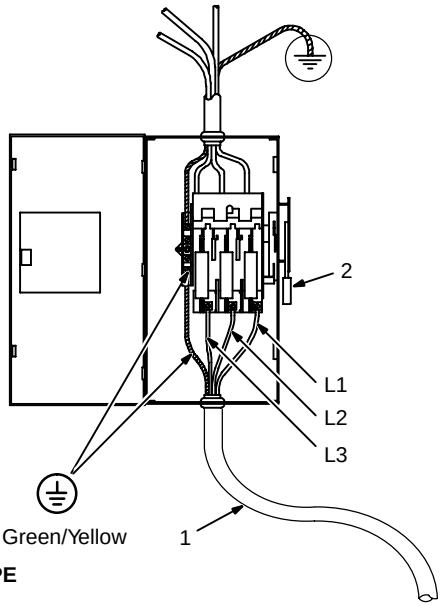
Ref. ST-801 866

3-9. Electrical Service Guide

Input Voltage	400
Input Amperes At Rated Output	16.9
Max Recommended Standard Fuse Or Circuit Breaker Rating In Amperes	25
Min Input Conductor Size In AWG/Kcmil	14
Max Recommended Input Conductor Length In Feet (Meters)	153 (47)
Min Grounding Conductor Size In AWG/Kcmil	14
Reference: 1996 National Electrical Code (NEC).	S-0092J

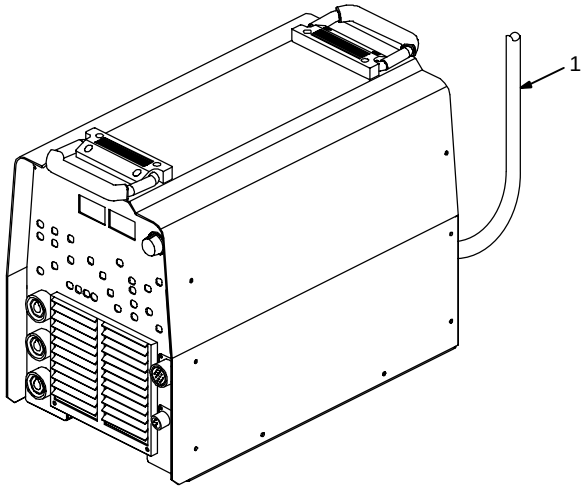
3-10. Connecting Input Power





= GND/PE

Always connect grounding conductor first.



Check input voltage available at site.

1 Input And Grounding Conductors

2 Line Disconnect Device

See Section 3-9.

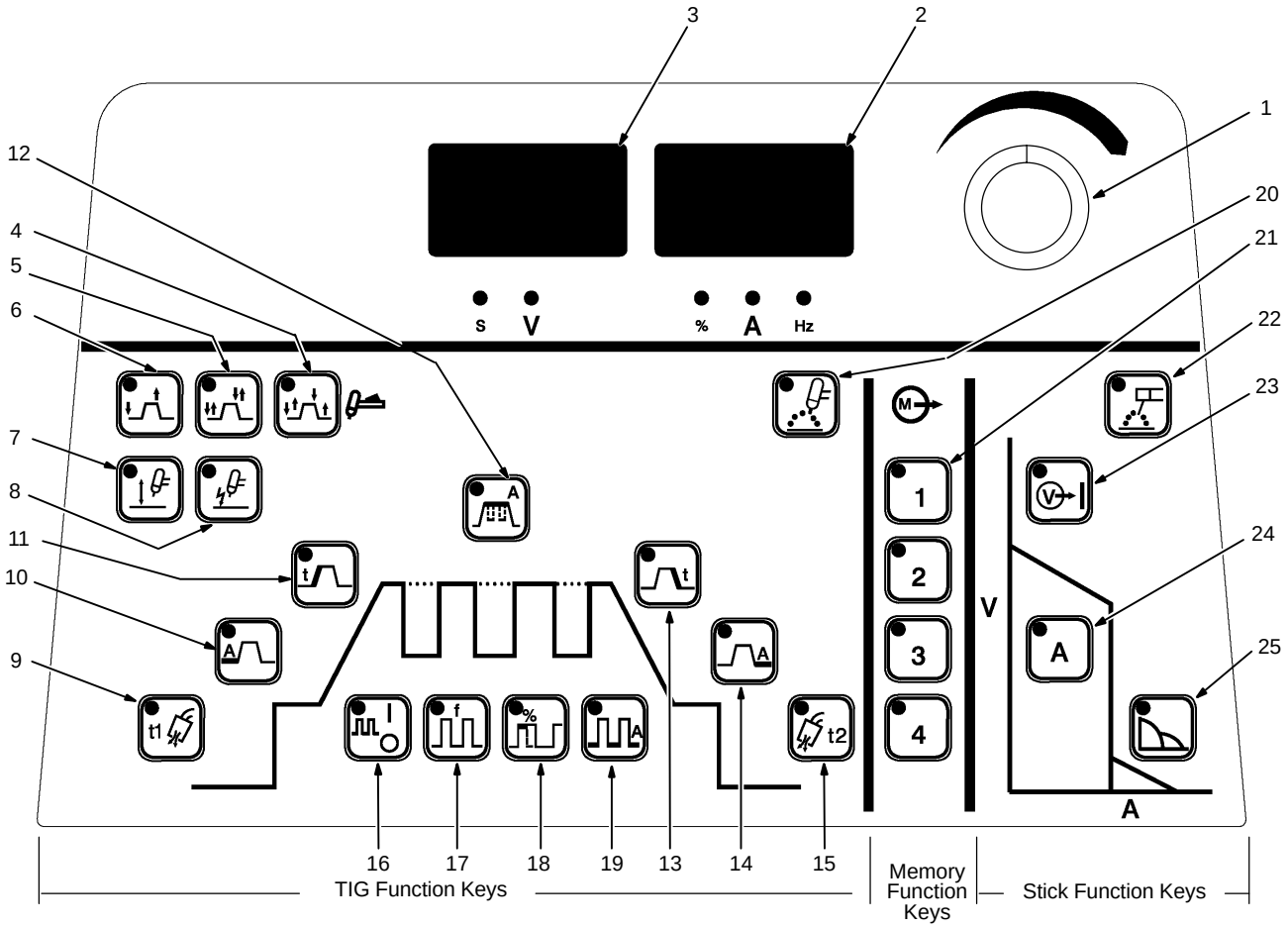
Always connect green/yellow wire to supply grounding terminal, never to a line terminal. Connect black, brown, and blue wires (L1, L2, L3) to line terminals.

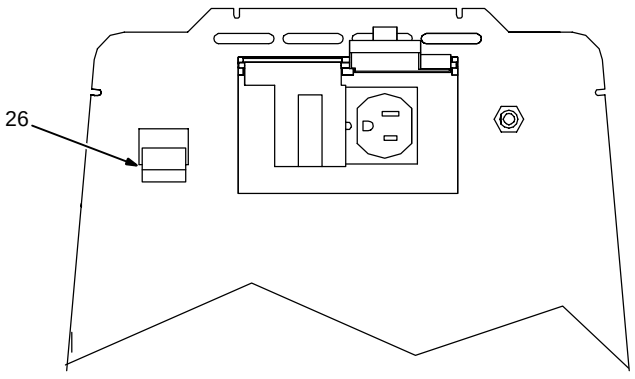
Ref. ST-801 957-A

Notes

SECTION 4 – OPERATION

4-1. Controls (See Section 4-2)





Rear Panel

ST-186 715-A / Ref. ST-801 866

4-2. Description Of Controls (See Section 4-1)

For all front panel key pad controls: press key pad to turn on light and enable function.

1 Encoder Control

Use encoder control in conjunction with applicable front panel function key pads to change values for that function.

2 Ammeter

Displays amperage and preset parameters for applicable pulse functions.

3 Voltmeter

Displays arc voltage and preset time, in seconds, for applicable function controls.

4 4T Mode

Press key pad. Press and hold torch trigger to start weld sequence, release trigger to start upslope. Press trigger to start downslope, release trigger to start postflow.

While in 4T mode, there is a feature available during the main weld sequence that allows the operator to toggle between weld current and final current. To switch from weld current to final current, press and release torch trigger within 3/4 seconds. To return to weld current, press and release torch trigger within 3/4 seconds again.

5 2T Mode

Press key pad. Press and release torch trigger to start weld sequence. Press and release trigger to start downslope.

6 Normal Trigger Mode

Press key pad. Press and hold torch trigger to start weld sequence, release trigger to go to downslope.

7 Lift-Arc™ Start Mode

See Section 4-3.

8 HF Start Mode

See Section 4-3.

9 Preflow Control

Press key pad and turn encoder control to set time, 0–15 seconds, gas flows before welding electrode is energized. Preflow control is disabled if Lift-Arc Start mode is selected.

10 Initial Amperage Control

Press key pad and turn encoder control to select a starting amperage, 5–300 amps, that is different from the weld amperage.

11 Initial Slope Time Control

Press key pad and turn encoder control to select length of time, 0–25 seconds, that it takes to slope the amperage up/down from start amperage to weld amperage.

12 TIG Weld Amps And Peak Amps While Pulsing Control

Press key pad and turn encoder control to select 5–300 amps for TIG welding, or peak amps while pulsing.

13 Final Slope Time Control

Press key pad and turn encoder control to select length of time, 0–25 seconds, that it takes to slope the amperage up/down from weld amperage to final amperage.

14 Final Amperage Control

Press key pad and turn encoder control to select 5–300 amps of final amperage. Final amperage is the amperage to which the weld amperage has sloped up/down to.

15 Postflow Control

Press key pad and turn encoder control to set time, 0–50 seconds, gas flows after welding stops.

16 Pulser On/Off Control

Press key pad to turn on light and enable pulser function.

17 Pulse Frequency Control

Press key pad and turn encoder control to set pulse frequency, .1–500 pps (pulses per second).

18 Pulse Width Control

Press key pad and turn encoder control to set percentage of time, 5–95%, amperage is at peak for each pulse.

19 Background Amperage Control

Press key pad and turn encoder control to set background amperage as a percentage, 5–95%, of peak amperage.

20 TIG Process Select Mode

Press key pad to select TIG Process.

21 1–4 Program Storage

Each program key pad, 1–4, is capable of storing two welding parameters programs, one for TIG, or one for Stick, depending on whether TIG function or Stick function keys are enabled.

22 Stick Process Select Mode

Press key pad to select Stick process.

23 Contactor Control (Stick)

Press key pad to turn on light and enable output.

24 Stick Amperage Control

Press key pad and turn encoder control to select 5–300 amps for Stick welding.

25 DIG Control

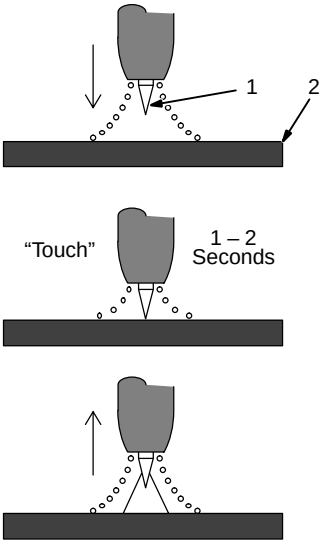
Press and hold key pad while turning Encoder control to set DIG (0–100%).

When set lower, short-circuit amperage at low arc voltage is the same as normal welding amperage.

When set higher, short-circuit amperage is increased at low arc voltage to help with arc starting and making overhead or vertical welds, as well as to reduce sticking while welding.

26 Power On/Off Switch

4-3. Lift-Arc™ And HF TIG Start Procedures



Do NOT Strike Like A Match!

When Lift-Arc button light is On, start arc as follows:

1 TIG Electrode

2 Workpiece

Touch tungsten electrode to workpiece at weld start point, enable output with torch trigger, foot control, or hand control. **Hold electrode to workpiece for 1-2 seconds**, and slowly lift electrode. An arc will form when electrode is lifted.

Normal open-circuit voltage is not present before tungsten electrode touches workpiece; only a low sensing voltage is present between electrode and workpiece. The solid-state output contactor does not energize until after electrode is touching workpiece. This allows electrode to touch workpiece without overheating, sticking, or getting contaminated.

When HF Start button light is On, start arc as follows:

High frequency turns on to help start arc when output is enabled. High frequency turns off when arc is started, and turns on whenever arc is broken to help restart arc.

SECTION 5 – MAINTENANCE AND TROUBLESHOOTING

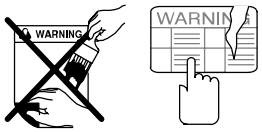
5-1. Routine Maintenance

Disconnect power before maintaining.

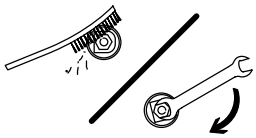
Maintain more often during severe conditions.

3 Months

Replace unreadable labels.



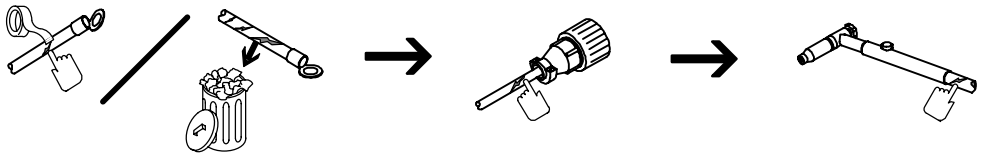
Clean and tighten weld terminals.



Replace Damaged Gas Hose

3 Months

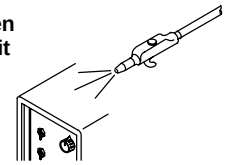
Repair Or Replace Cracked Cables And Cords



6 Months

Do not remove case when blowing out inside of unit (see Section 5-2) .

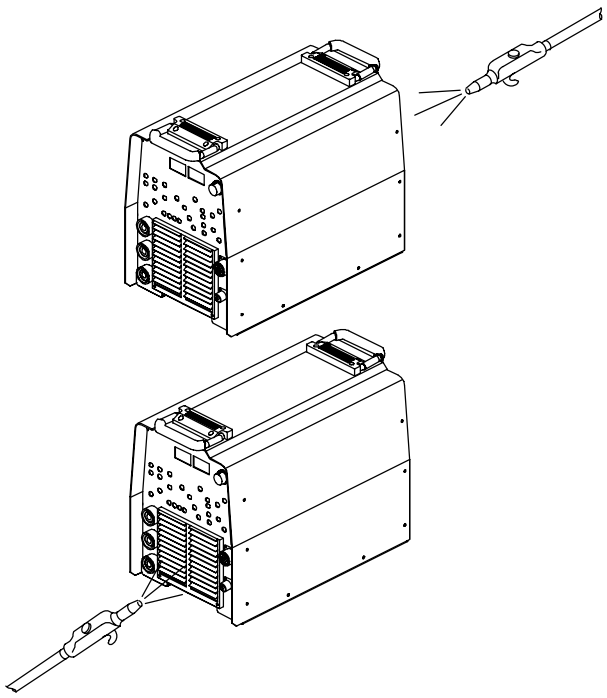
Blow out inside. During heavy service clean monthly.



5-2. Blowing Out Inside Of Unit

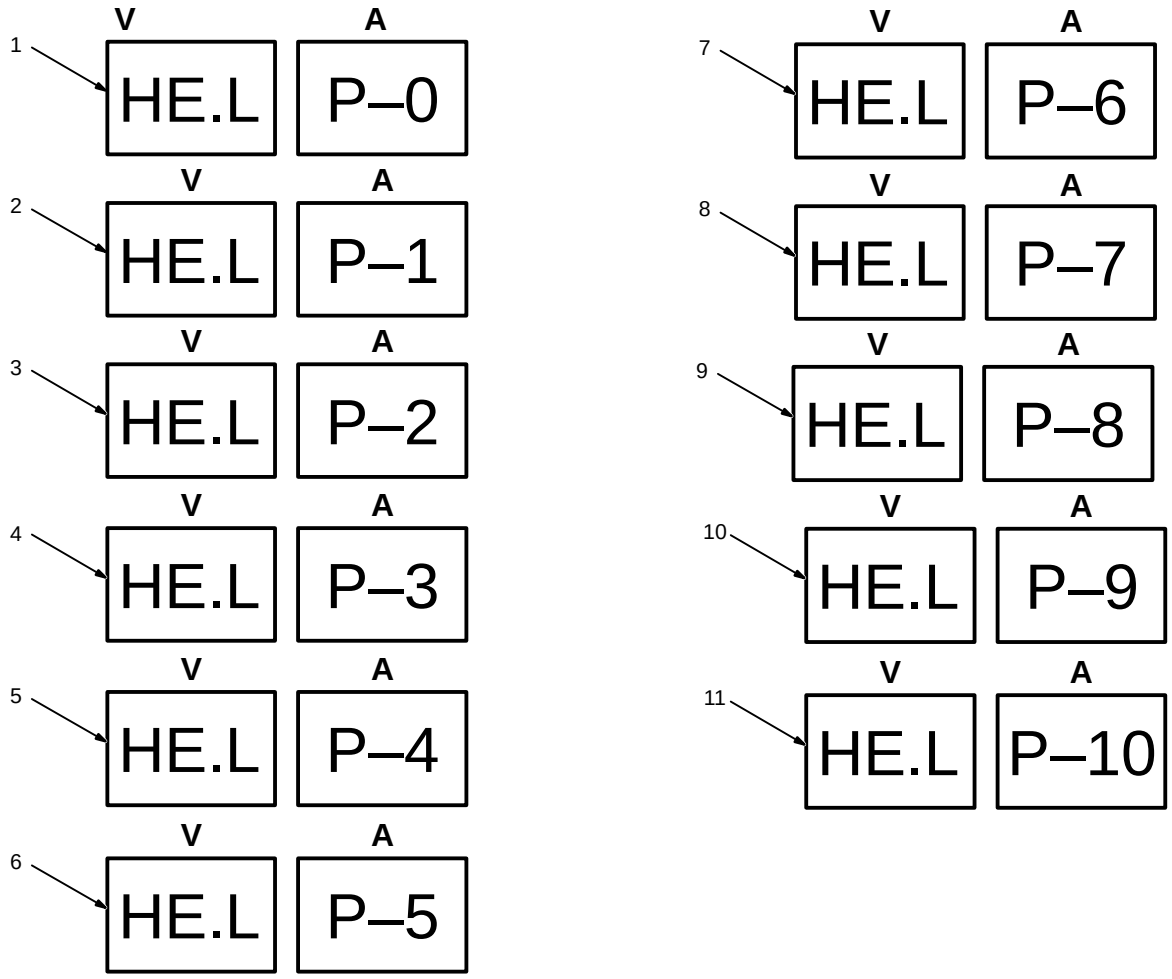
Do not remove case when blowing out inside of unit.

To blow out unit, direct airflow through front and back louvers as shown.



ST-801 956-A

5-3. Voltmeter/Ammeter Help Displays



All directions are in reference to the front of the unit. All circuitry referred to is located inside the unit.

1 Help 0 Display

Indicates a malfunction in the thermal protection circuitry located on the left side of the unit. Contact a Factory Authorized Service Agent if this display is shown.

2 Help 1 Display

Indicates a malfunction in the primary power circuit. Contact a Factory Authorized Service Agent if this display is shown.

3 Help 2 Display

Indicates a malfunction in the thermal protection circuitry located on the left side of the unit. Contact a Factory Authorized Service Agent if this display is shown.

4 Help 3 Display

Indicates the left side of the unit has overheated. The unit has shut down to allow the fan to cool it (see Section 3-2). Operation will continue when the unit has cooled.

5 Help 4 Display

Indicates a malfunction in the thermal protection circuitry located on the right side of the unit. Contact a Factory Authorized Service Agent if this display is shown.

6 Help 5 Display

Indicates the right side of the unit has overheated. The unit has shut down to allow the fan to cool it (see Section 3-2). Operation will continue when the unit has cooled.

7 Help 6 Display

Indicates that the input voltage is too low and the unit has automatically shut down. Operation will continue when the voltage is within the operating range (±15%). Have an electrician check the input voltage if this display is shown.

8 Help 7 Display

Indicates that the input voltage is too high and the unit has automatically shut down. Operation will continue when the voltage is within the operating range (±15%). Have an electrician check the input voltage if this display is shown.

9 Help 8 Display

Indicates a malfunction in the secondary power circuit of the unit. Contact a Factory Authorized Service Agent if this display is shown.

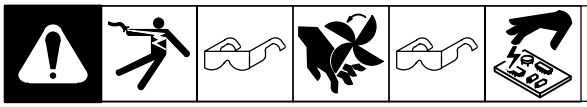
10 Help 9 Display

Indicates a malfunction in the thermal protection circuitry located on the right side of the unit. Contact a Factory Authorized Service Agent if this display is shown.

11 Help 10 Display

Indicates gun trigger is depressed. Release trigger to continue.

5-4. Troubleshooting



Trouble	Remedy
No weld output; unit completely inoperative.	Place line disconnect switch in On position (see Section 3-10).
	Check and replace line fuse(s), if necessary, or reset circuit breaker (see Section 3-10).
	Check for proper input power connections (see Section 3-10).
No weld output; meter display On.	If using remote control, be sure correct process is enabled to provide output control at Remote 14 receptacle (see Section 3-6 as applicable).
	Input voltage outside acceptable range of variation (see Section 3-9).
	Check, repair, or replace remote control.
	Unit overheated. Allow unit to cool with fan On (see Section 3-2).
Erratic or improper weld output.	Use proper size and type of weld cable (see Section 3-5).
	Clean and tighten all weld connections.
No 115 volts ac output at duplex receptacle.	Reset circuit breaker CB1 (see Section 3-8).
Fan not operating.	Check for and remove anything blocking fan movement.
	Have Factory Authorized Service Agent check fan motor.
Wandering arc	Use proper size tungsten.
	Use properly prepared tungsten.
	Reduce gas flow rate.
Tungsten electrode oxidizing and not remaining bright after conclusion of weld.	Shield weld zone from drafts.
	Increase postflow time.
	Check and tighten all gas fittings.
	Water in torch. Refer to torch manual.

SECTION 6 – ELECTRICAL DIAGRAM

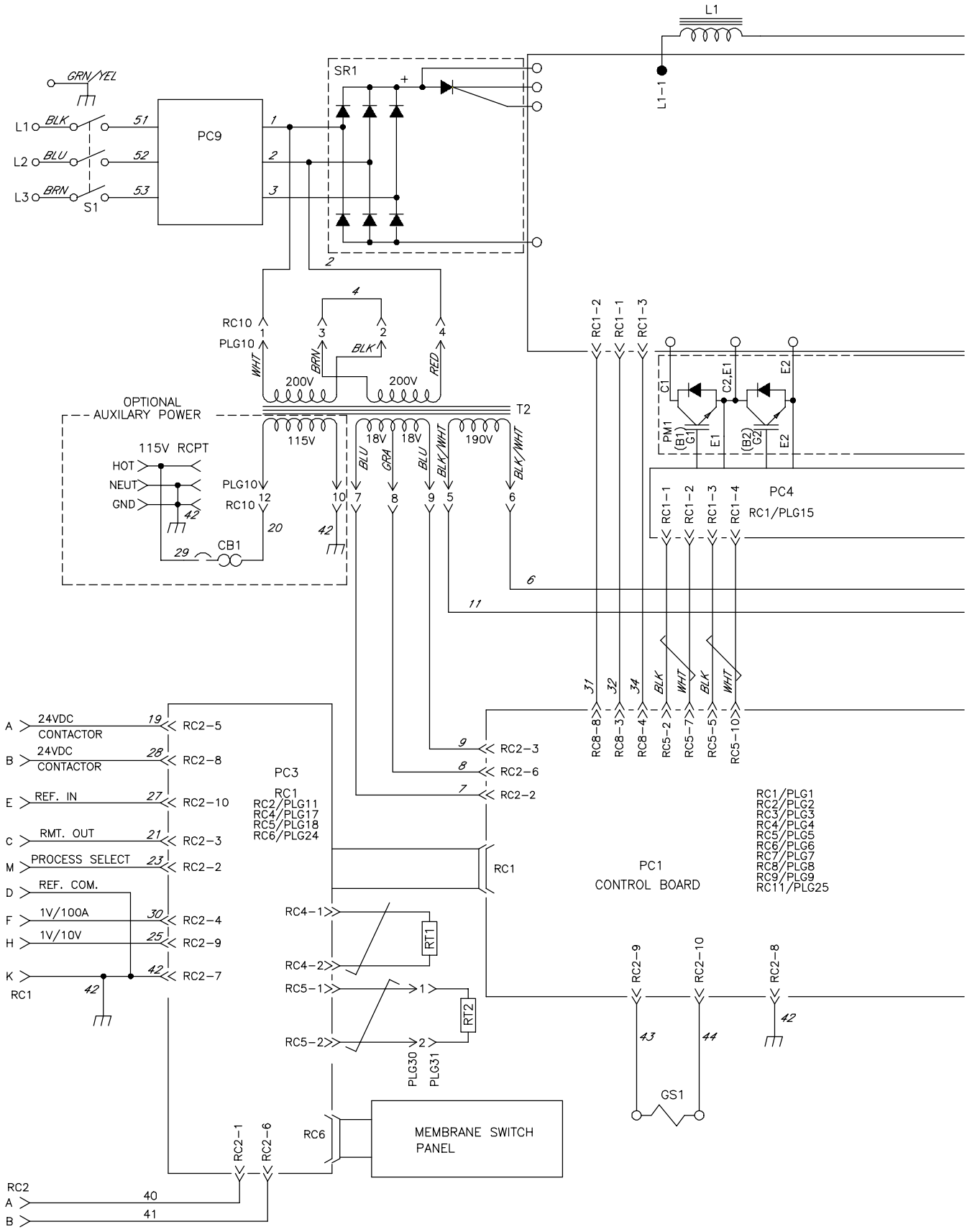
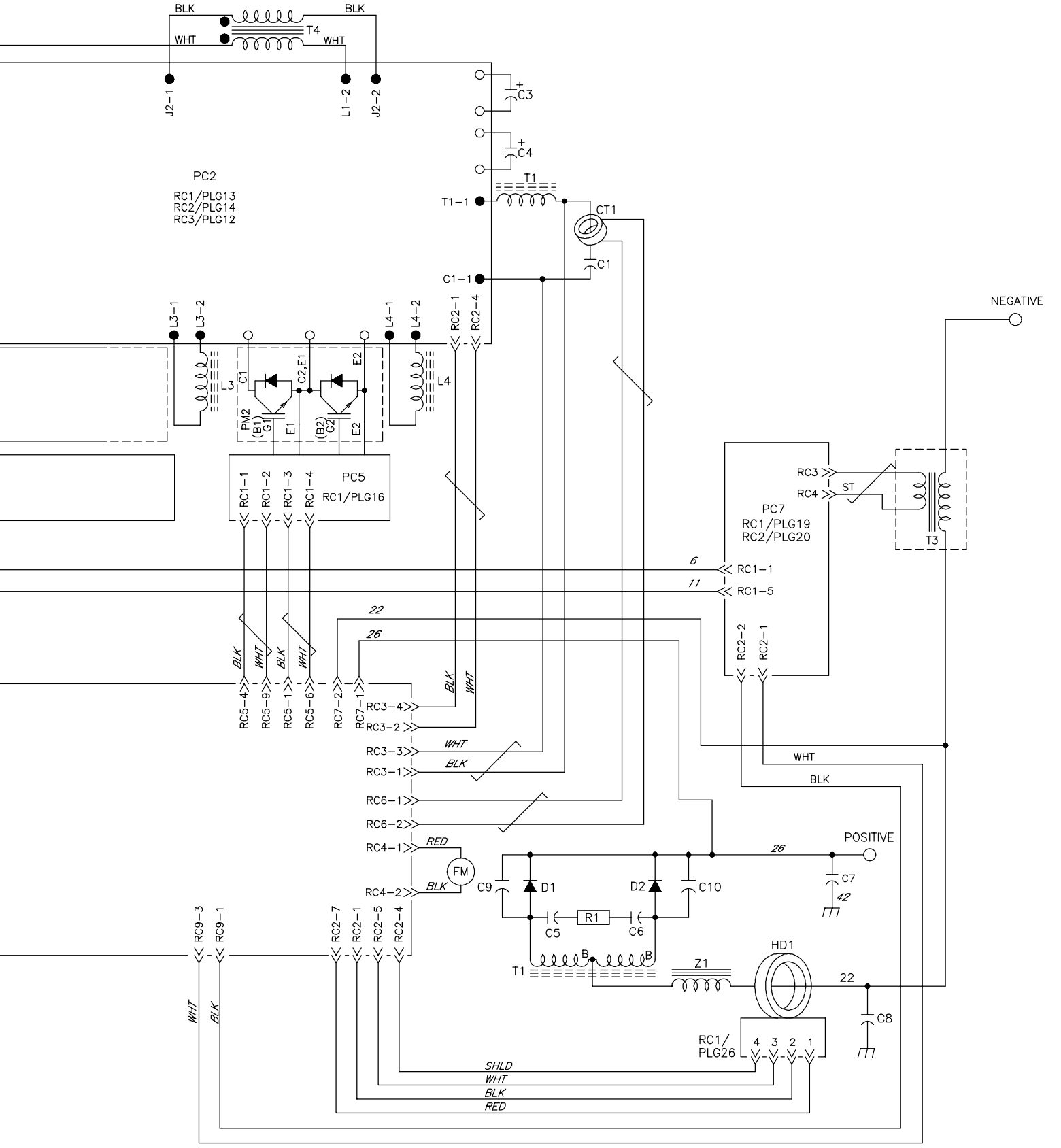


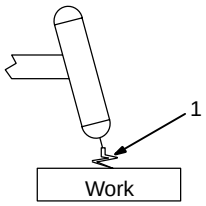
Figure 5-1. Circuit Diagram


BLK
BLK
T4
WHT
WHT
J2-1
L1-2
J2-2
C3
C4
PC2
RC1/PLG13
RC2/PLG14
RC3/PLG12
T1
T1-1
CT1
C1
C1-1
NEGATIVE
L3-1
L3-2
L4-1
L4-2
RC2-1
RC2-4
L3
L4
C1
C2,E1
E2
PM2
(B1)
G1
E1
(B2)
G2
E2
PC5
RC1/PLG16
RC1-1
RC1-2
RC1-3
RC1-4
PC7
RC1/PLG19
RC2/PLG20
RC3
RC4
ST
T3
6
11
RC1-1
RC1-5
22
26
RC2-2
RC2-1
BLK
WHT
BLK
WHT
RC5-4
RC5-9
RC5-1
RC5-6
RC7-2
RC7-1
RC3-4
RC3-2
RC3-3
RC3-1
WHT
BLK
WHT
BLK
RC6-1
RC6-2
RC4-1
RC4-2
RED
BLK
FM
POSITIVE
26
C9
D1
D2
C10
C7
42
R1
C5
C6
RC9-3
RC9-1
RC2-7
RC2-1
RC2-5
RC2-4
T1
B
B
Z1
HD1
22
C8
WHT
BLK
RC1/
PLG26
4
3
2
1
SHLD
WHT
BLK
RED

SC-184 001-D

SECTION 7 – HIGH FREQUENCY

7-1. Welding Processes Requiring High Frequency



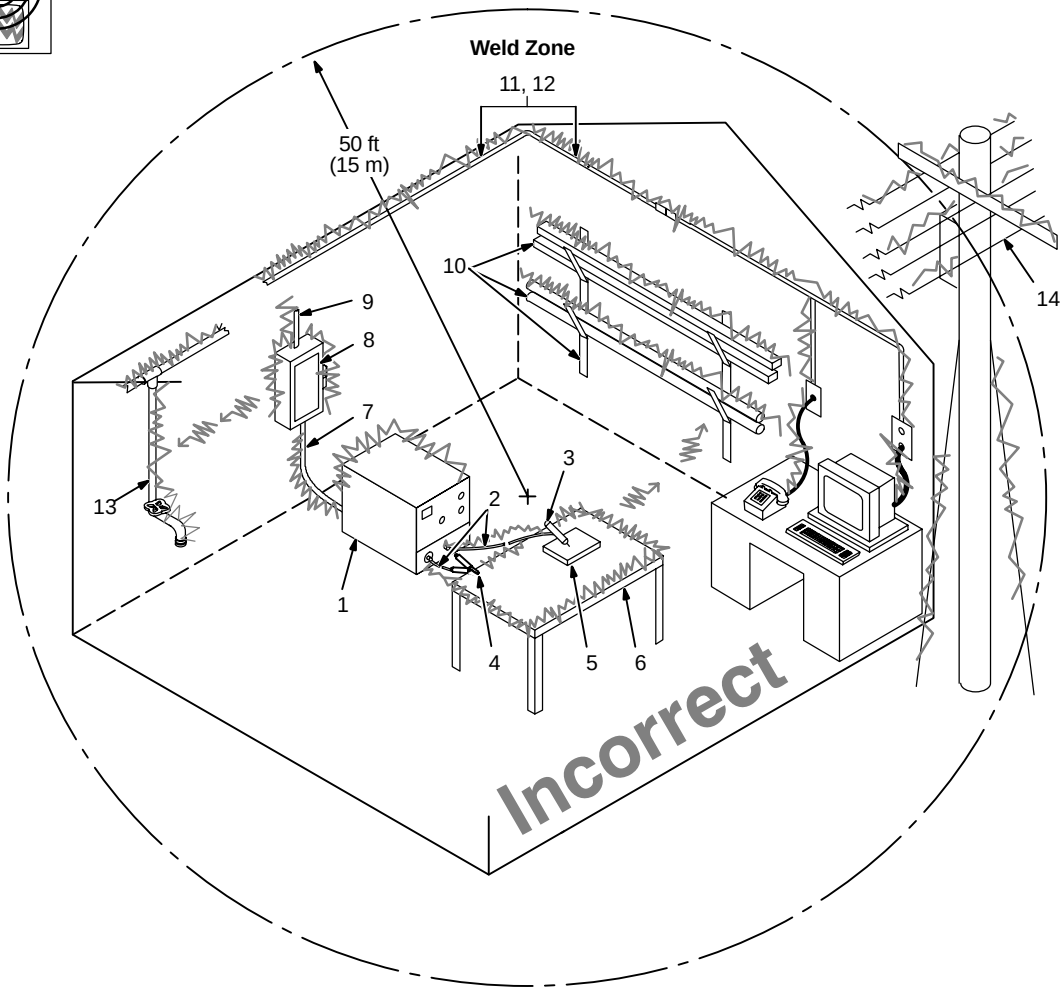
TIG

1 High-Frequency Voltage

TIG – helps arc jump air gap between torch and workpiece and/or stabilize the arc.

high_freq 12/96 – S-0693

7-2. Incorrect Installation



Sources of Direct High-Frequency Radiation

1 High-Frequency Source (welding power source with built-in HF or separate HF unit)
2 Weld Cables
3 Torch
4 Work Clamp
5 Workpiece
6 Work Table

Sources of Conduction of High Frequency

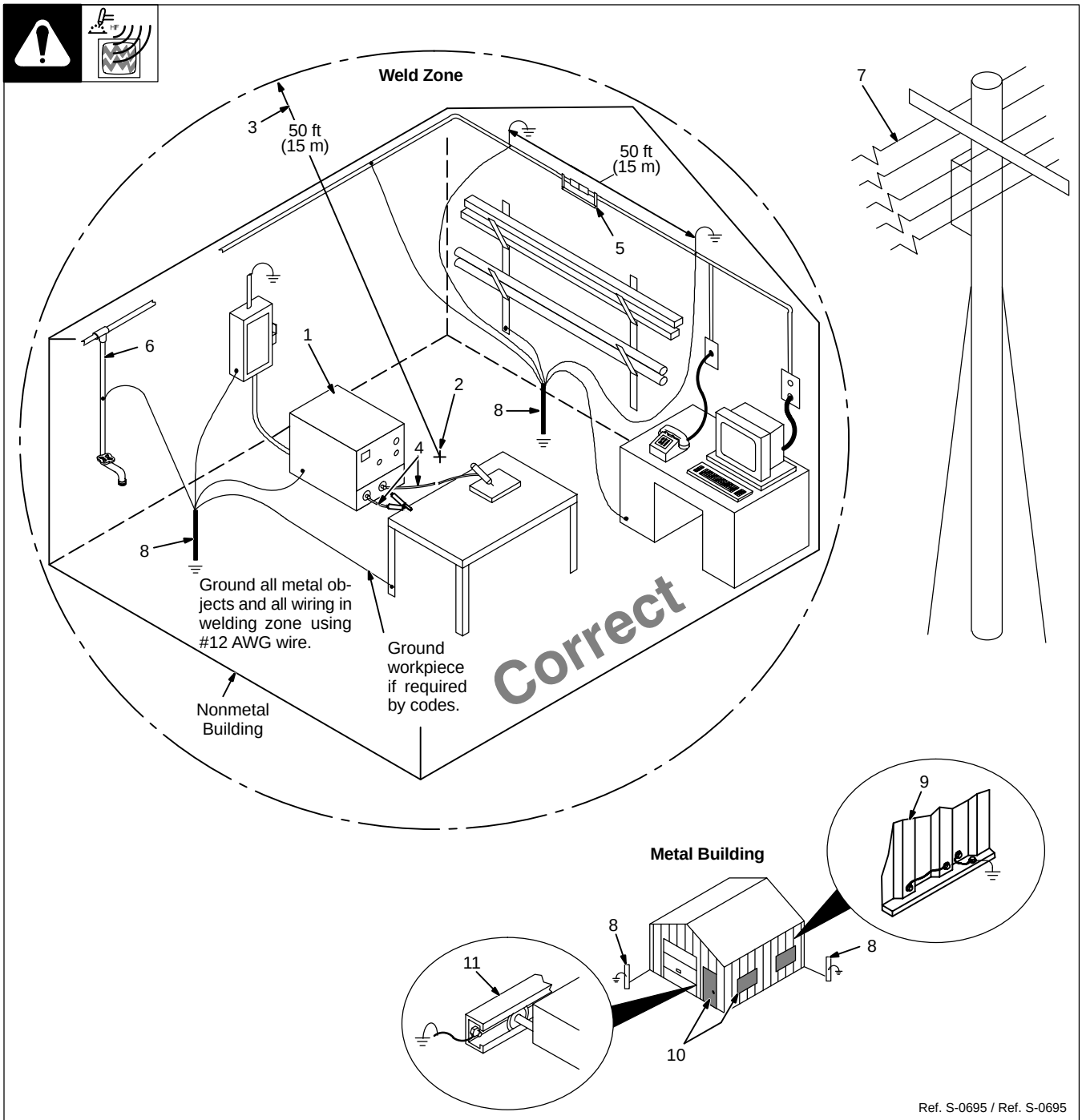
7 Input Power Cable
8 Line Disconnect Device
9 Input Supply Wiring

Sources of Reradiation of High Frequency

10 Ungrounded Metal Objects
11 Lighting
12 Wiring
13 Water Pipes and Fixtures
14 External Phone and Power Lines

S-0694

7-3. Correct Installation



Ref. S-0695 / Ref. S-0695

1 High-Frequency Source (welding power source with built-in HF or separate HF unit)

Ground metal machine case, work output terminal, line disconnect device, input supply, and worktable.

2 Center Point of Welding Zone

Midpoint between high-frequency source and welding torch.

3 Welding Zone

A circle 50 ft (15 m) from center point in all directions.

4 Weld Output Cables

Keep cables short and close together.

5 Conduit Joint Bonding and Grounding

Electrically join (bond) all conduit sections using copper straps or braided wire. Ground conduit every 50 ft (15 m).

6 Water Pipes and Fixtures

Ground water pipes every 50 ft (15 m).

7 External Power or Telephone Lines

Locate high-frequency source at least 50 ft (15 m) away from power and phone lines.

8 Grounding Rod

Consult the National Electrical Code for specifications.

Metal Building Requirements

9 Metal Building Panel Bonding Methods

Bolt or weld building panels together, install copper straps or braided wire across seams, and ground frame.

10 Windows and Doorways

Cover all windows and doorways with grounded copper screen of not more than 1/4 in (6.4 mm) mesh.

11 Overhead Door Track

Ground the track.

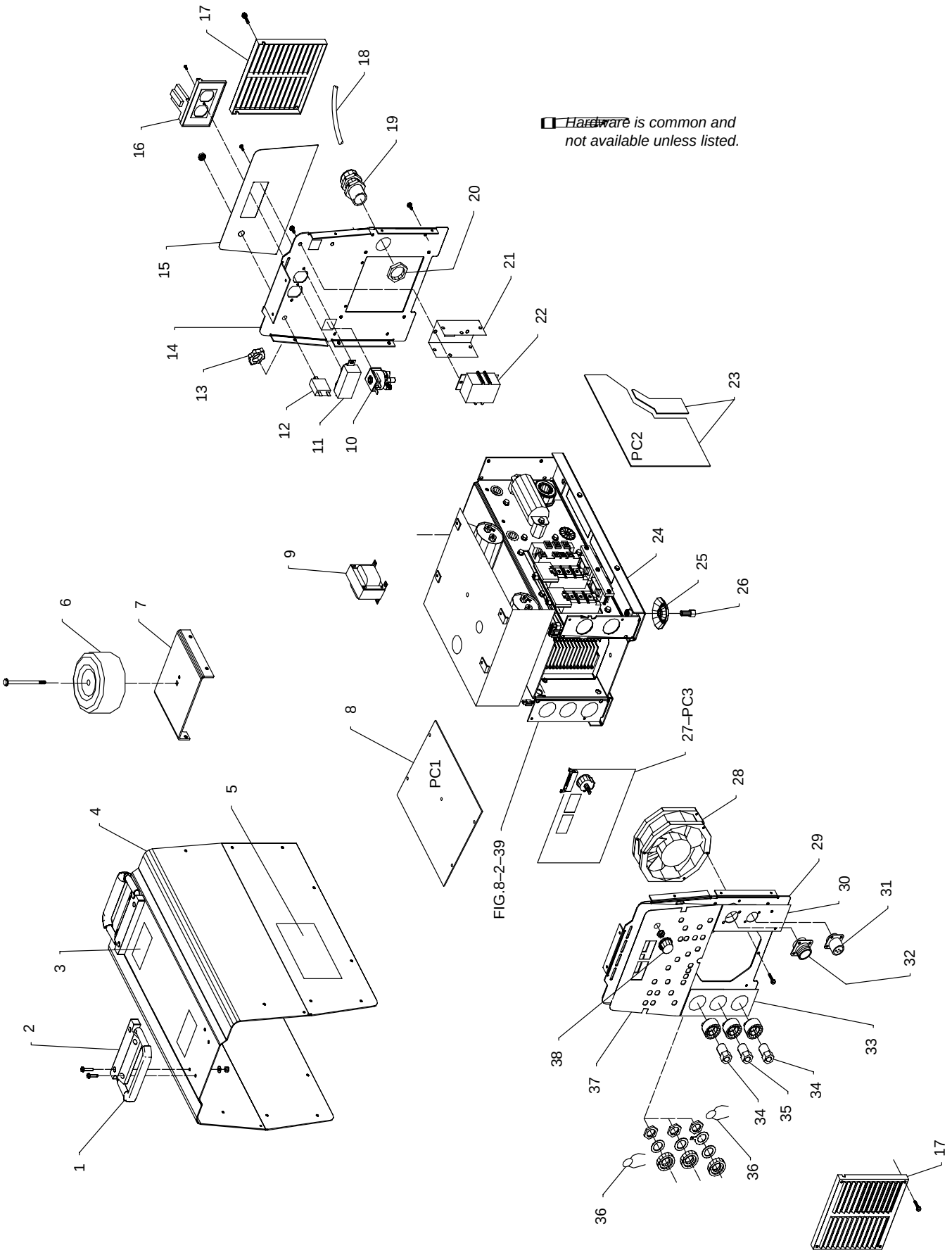


Figure 8-1.Main Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
			Figure 8-1. Main Assembly	
1		126 416	HANDLE	2
2		126 415	CLAMP, saddle	2
3		179 309	LABEL, caution falling	2
4		+175 148	WRAPPER	1
		175 256	INSULATOR, side RH & LH	2
5		179 310	LABEL, warning general precautionary	2
6	T2	♦179 200	TRANSFORMER, control	1
7		♦187 461	BRACKET, mtg aux transformer	1
	RC10	115 094	CONNECTOR & SOCKETS	1
8	PC1	188 740	CIRCUIT CARD ASSEMBLY, control	1
	PLG2	115 091	CONNECTOR & SOCKETS	1
	PLG3	183 086	PLUG, w/leads	1
	PLG4	135 635	CONNECTOR & PINS	1
	PLG5,15,16	175 026	PLUG, w/leads	1
	PLG7	183 596	PLUGS, w/leads secondary gate	1
	PLG8	115 092	CONNECTOR & SOCKETS	1
	PLG9	183 595	PLUG, w/leads	1
	PLG10	115 094	CONNECTOR & SOCKETS	1
9	T2	180 873	TRANSFORMER, control	1
10	GS1	133 873	VALVE, 24VDC 2way	1
11		♦604 176	RECEPTACLE, str dx grd 2P 3W 15A	1
12	CB1	♦161 078	CIRCUIT BREAKER, 1P 7A 250VAC	1
13		605 227	NUT, .750-14 knurled	1
14		182 205	PANEL, rear	1
15			PLATE, identification rear (order by model & serial number)	1
16		♦175 282	COVER, receptacle	1
17		175 138	BOX, louver	2
18		179 625	CABLE, pwr	1
19		186 440	BUSHING, strain relief .350/.630 ID	1
20		182 445	NUT, stl locking	1
21		176 226	INSULATOR, switch power	1
22	S1	128 756	SWITCH, tgl 3PST 40A 600VAC (Power Switch)	1
23	PC2	183 620	CIRCUIT CARD, assembly	1
		176 879	SCREW, M5–.8–2	18
	PLG13	131 204	CONNECTOR & SOCKETS	1
	PLG14	183 086	PLUG, w/leads	1
		179 626	BUS BAR, interconnecting	1
24		+175 132	BASE	1
25		173 693	FOOT, mtg unit	4
26		176 736	SCREW, mtg foot	4
27	PC3	185 533	CIRCUIT CARD, front panel (consisting of)	1
	DD1-6	186 914	LED	6
	PLG11	115 091	CONNECTOR & SOCKETS	1
28	FM	175 084	MOTOR, fan 24VDC 3000RPM	1
29		186 945	PANEL, front	1
30		188 152	NAMEPLATE, RH (order by model and serial number)	1
31	RC2	188 187	CONNECTOR & SOCKETS	1
32	RC1	188 186	CONNECTOR & SOCKETS	1
33		183 565	NAMEPLATE, LH (order by model and serial number)	1
34		185 703	RECEPTACLE, twist lock assembly	2
35		188 192	RECEPTACLE, male	1
36	C7,8	186 543	CAPACITOR ASSEMBLY	2
37			NAMEPLATE, (order by model and serial number)	1
38		186 952	KNOB, encoder	1
39		Fig 8-2	WINDTUNNELS w/COMPONENTS	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

♦Optional

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Hardware is common and not available unless listed.

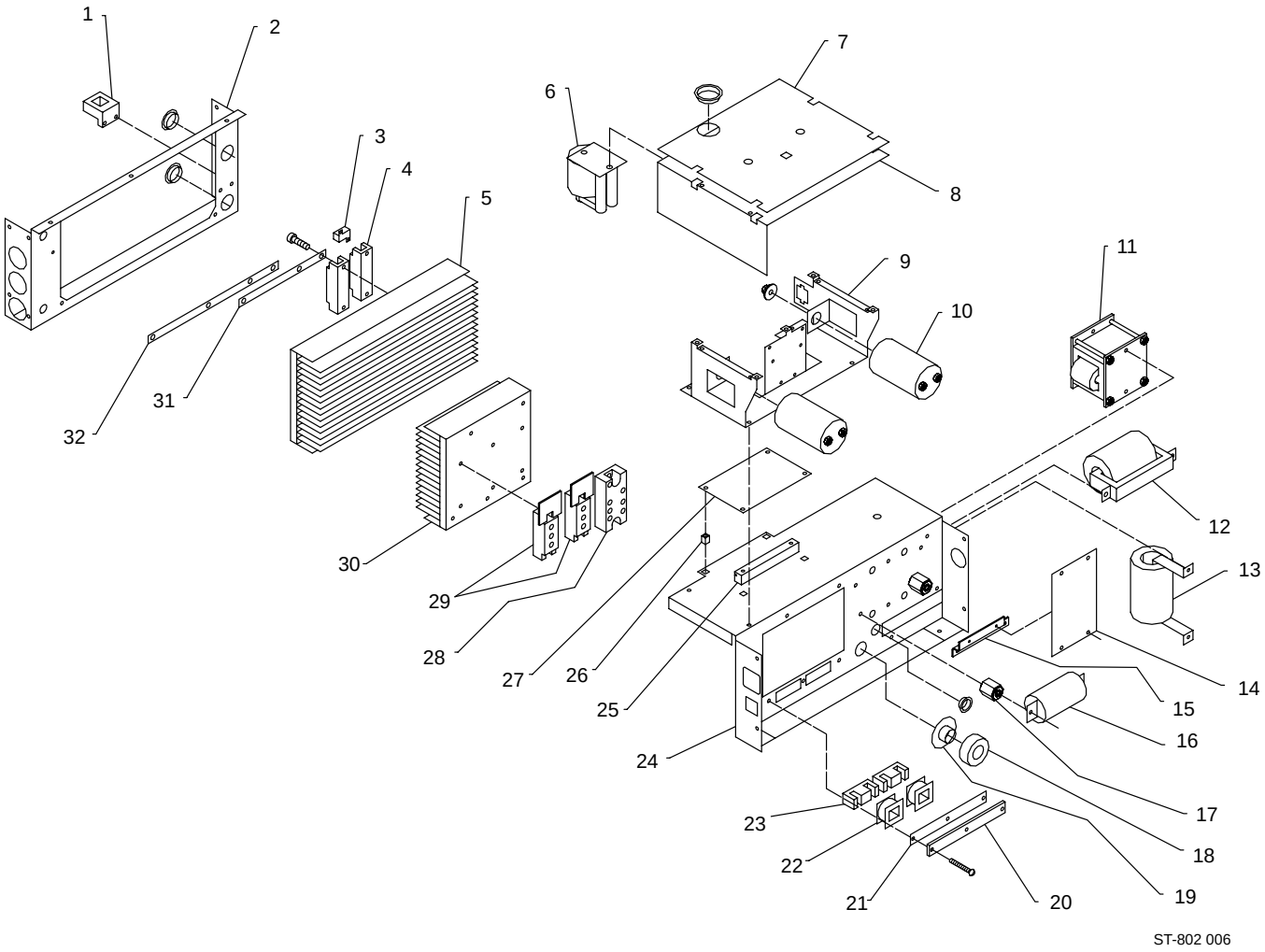


Figure 8-2.Windtunnels w/Components

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
			Figure 8-2. Windtunnels w/Components (Fig 6-1 Item 39)	
1	HD1	182 918	TRANSDUCER, current 400A	1
2		+182 206	WINDTUNNEL, LH	1
		185 836	LABEL, warning exploding parts	2
3	R1,C5,6	175 194	RESISTOR/CAPACITOR	1
4	D1,2	185 775	KIT, diode	1
5		182 208	HEAT SINK	1
6	T3	182 667	TRANSFORMER, coupling	1
7		183 073	INSULATOR, PC card HF	1
8		182 499	ENCLOSURE, HF	1
9		182 806	BRACKET, mtg contactor/capacitor/PC board	1
10	C3,4	174 980	CAPACITOR, elctlt 2700uf 420VDC	2
11	T1	183 014	TRANSFORMER, HF	1
12	L2	183 009	STABILIZER, output	1
13	L1	187 522	INDUCTOR, input	1
14	PC9	187 264	CIRCUIT CARD ASSEMBLY, input filter	1
15		187 463	BRACKET, filter board	1
16	C1	186 549	CAPACITOR, polyp .27uf 1000VDC	1
17		025 248	STAND-OFF, insul .250-20 x 1.250 lg	2

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 8-2. Windtunnels w/Components (Fig 6-1 Item 39)

18	CT1	175 199	TRANSFORMER, current	1
19		177 547	BUSHING, snap-in CT-mount	1
20		175 140	BRACKET, DI-DT	1
21		181 197	GASKET, DI-DT rubber	1
22	L3,4	175 482	COIL, DI-DT	2
23		109 056	CORE	2
24		+187 460	WINDTUNNEL, RH	1
25		188 008	BAR, support PC card	1
26		141 690	GROMMET, scr No. 8/10	2
27	PC7	191 397	CIRCUIT CARD, HF (consisting of)	1
	F1	012 633	FUSE, mintr gl 1A 250V	1
	PLG19	115 092	CONNECTOR & SOCKETS	1
	PLG20	183 595	PLUG, w/leads	1
28	SR1	179 629	KIT, diode	1
29	PM1,2/PC4,5	179 628	KIT, transistor IGBT module	1
	RT1,2	173 632	THERMISTOR, NTC 30K ohm	2
30		173 631	HEAT SINK, power module	1
31		182 641	BUS BAR, diode IGBT	1
32		185 587	BUS BAR, diode	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Notes

Warranty Questions?

Call
1-800-4-A-MILLER
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Miller distributor.

Your distributor also gives you ...

Service
You always get the fast, reliable response you need. Most replacement parts can be in your hands in 24 hours.

Support
Need fast answers to the tough welding questions? Contact your distributor. The expertise of the distributor and Miller is there to help you, every step of the way.

Miller
The Power of Blue.

TRUE BLUE® WARRANTY

Effective January 1, 2000
(Equipment with a serial number preface of "LA" or newer)

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY – Subject to the terms and conditions below, Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to a North American distributor or eighteen months after the equipment is sent to an International distributor.

1. 5 Years Parts – 3 Years Labor
   * Original main power rectifiers
   * Inverters (input and output rectifiers only)
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Inverter Power Supplies
   * Intellitig
   * Engine Driven Welding Generators **(NOTE: Engines are warranted separately by the engine manufacturer.)**
3. 1 Year — Parts and Labor
   * DS-2 Wire Feeder
   * Motor Driven Guns (w/exception of Spoolmate 185 & Spoolmate 250)
   * Process Controllers
   * Positioners and Controllers
   * Automatic Motion Devices
   * RFCS Foot Controls
   * Induction Heating Power Sources
   * Water Coolant Systems
   * HF Units
   * Grids
   * Maxstar 140
   * Spot Welders
   * Load Banks
   * Miller Cyclomatic Equipment
   * Running Gear/Trailers
   * Plasma Cutting Torches (except APT & SAF Models)
   * Field Options
     (NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 6 Months — Batteries
5. 90 Days — Parts
   * MIG Guns/TIG Torches
   * Induction Heating Coils and Blankets
   * APT, ZIPCUT & PLAZCUT Model Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts (No labor)
   * Spoolmate 185 & Spoolmate 250
   * Canvas Covers

Miller's True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear.**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

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Owner's Record

Please complete and retain with your personal records.

Model Name Serial/Style Number

Purchase Date (Date which equipment was delivered to original customer.)

Distributor

Address

City

State Zip

For Service

Call 1-800-4-A-Miller or see our website at www.MillerWelds.com to locate a DISTRIBUTOR or SERVICE AGENCY near you.

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:	Welding Supplies and Consumables
	Options and Accessories
	Personal Safety Equipment
	Service and Repair
	Replacement Parts
	Training (Schools, Videos, Books)
	Technical Manuals (Servicing Information and Parts)
	Circuit Diagrams
	Welding Process Handbooks
Contact the Delivering Carrier for:	File a claim for loss or damage during shipment.
For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.	

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